self that those which are non-medullated are neither irritable nor conductive, and, further, that by using weak electrical stimuli, the escape of the current, so much talked of, in such observations, is to be little feared. These facts being accepted, the results have much value.

He experimented on puppies without any anaesthetic. In new-born puppies, the lateral and anterior portion of the posterior columns, the so-called root portion of the columnae cuneatae, the fundamental tracts in the anterior and lateral columns, and the direct cerebellar tract, are alone medullated. About five days after birth, the columns of Goll become medullated, and eleven to thirteen days after birth the pyramidal tracts acquire their sheaths.

Stimulating the cut section of the cord in new-born puppies, in the region of the root fibres of the cuneate columns, produces a contraction of the muscles which are innervated by motor nerves arising at that level, much the result one would get from stimulating the posterior nerve roots of the region.

Stimulation of the columns of Goll, five days, later produces reflex contractions of the head, trunk and limbs, as in the adult, but without any indications of pain. It will be seen that the reaction is more diffused in this second case. The stimulation of the antero-lateral fundamental tract in the caudal portion of the cord, the section having been made in the cervical region, produced contractions in the fore and hind limb of the same side, and in the tail, thus indicating the connections of these fibres.

Stimulation of the central end of the cord in the anterior part of the lateral region gave indications of centripetal fibres in this region, probably the tract described by Bechterew and Gowers, while the stimulation of the direct cerebellar tract gave characteristic movements of the head and trunk.

Not only, therefore, are these separate bundles in the cord each excitable, but each has a more or less distinct reaction.

Ueber die centralen Endigungen des N. vagus und über die Zusammensetzung des sogenannten solitären Bündels des verlängerten Marks. W. Bechterew. Wjestnik psychiatrii i nevropatologii, 1888, V. 2, Russisch. Reviewed in Neurolog. Centralbl. 1888, No. 10, by P. Rosenbach.

For the study of the terminations of the vagus fibres in the medulla, Bechterew found fœtuses about 28 cm. in length best suited, because at that stage of development it is mainly the nerve roots that are medullated, and these can then be easily followed by Weigert's method. The vagus fibres take several courses within the medulla. A considerable portion goes direct to the vagus nucleus. Another portion crosses the middle line to the N. ambiguus of the other side, while some fibres end in the N. ambiguus of the same side. Finally a portion goes to the Funiculus solitarius of the same side. The fibres entering the funiculus after a time emerge from it, and crossing the middle line, appear to end in a group of cells which lies mesial of the hypoglossus roots, dorsad of the inferior olive, and is longitudinally co-extensive with the hypoglossus nucleus. (This nucleus was described by Misslawski, see Neurolog. Centralbl. 1886, p. 560, and was stated by him to be the most important reflex centre for respiration.) The only other fibres which enter into the F. solita-

rius belong to the glossopharyngeus, and are stated to rise from a group of small cells which lies mesial and cephalad of the F. gracilis, at the level of the superior pyramidal decussation.

Beiträge zur Kenntnis des Centralnervensystems von Lumbricus. BENEDICT FRIEDLÄNDER. (Berlin.) Zeit. f. wiss. Zool. Bd. 47, pp. 47–83, pl. IX, X, September, 1888.

The author's chief attention was directed to the relationships and not to the ultimate structure of the histological elements. Of the three problematical "neural canals" or "giant fibres" of Leydig, the two lateral ones are shown to be directly continuous with the processes of ganglion cells at the posterior end of the ventral nerve cord, while all three at the anterior part are connected with common nerve fibres. The sheaths of these three structures are composed of connective tissue fibres, and are not comparable to the medullary sheath of vertebrate nerve fibres: the contents is a homogeneous plasma that may be squeezed out in elongated masses. Each lateral "giant fibre" receives the ascending processes of several large bipolar ganglion cells lying ventrally in successive ganglia near the posterior end of the cord, while its most posterior connection is with the similar process of an unipolar ganglion cell. These ascending processes of ganglion cells are connected with one another by transverse processes, and these in turn with the median "giant fibre." Though thus composed of fused cell processes, the "giant fibres" appear quite homogeneous in all the best preparations, and no indication of such complexity of structure as that claimed by Nausen could be obtained, though the author will not deny that such structure may exist. Artificial and deceptive results, due to imperfect means of hardening, are common and difficult to avoid. The "giant fibres" are undoubtedly nervous structures of unknown function; their sheaths may have acquired a secondary importance as aiding in stiffening the ventral nerve cord.

E. A. A.

Histologische Untersuchungen über das Nervensystem von Amphioxus. E. ROHDE. Zool. Anzeiger XI, 190; Vorläufige Mittheilung. Abstract in Centralbl. f. Physiol. No. 10, 1888, by Paneth.

This paper gains much interest from the recent description of colossal nerve fibres in the ventral cord of Lumbricus and other worms. The central nervous system consists, in Amphioxus, of cells which lie near the central canal, and of fibres surrounding them. The supporting substance is formed by the basal prolongations of the ependyma cells. In some cases the prolongations are branched, forming a fine network. The ganglion cells are uni-, bi-, or multipolar, the last being most numerous. Their prolongations form the external nervous substance, which is mainly constituted of fine longitudinally coursing nerve fibres, in which dichotomous divisions are frequent. There are, moreover, a number of very large fibres, definite in both number and position, which arise from large multipolar ganglion cells. These prolongations are of two kinds; all except one lose their size by repeated divisions and form fine longitudinal fibres, while this one passes without any diminution in size, caudad to the other end of the cord. The paired fibres from the anterior end arise from twelve ganglion cells. There is an